

3.3.1.5 Lake Michigan

3.3.1.5.1 Community Overview

Lake Michigan is among the largest and deepest lakes in the world. This massive waterbody covers 22,300 square miles and has 407 miles of coastline in Wisconsin. The lake is primarily cold water with summer maximum water temperatures below 22 degrees Celsius. Lake Michigan is relatively infertile, although it is warmer and more fertile than Lake Superior. Historically, the fish fauna consisted primarily of lake trout, ciscoes/whitefishes (Salmonidae), and sculpins (Cottidae). Warmer and more fertile harbors and bays (e.g., Green) had a more diverse assemblage of cool and warmwater fishes, especially in the family Percidae. Invasion by the sea lamprey due to commercial alterations of the Great Lakes waterways led to the first large-scale disruption of the biotic community, greatly depleting the native lake trout population. By the 1970's, three cisco species were extinct, and three others extirpated from Lake Michigan. (Only Lake Superior supports populations of two of these extirpated species, and only Lake Huron supports the third.) Over-harvest and other factors caused a steep decline in the population of lake herring. Now the biota is dominated by introduced or invasive non-native species, including Pacific salmon and trout, alewife, rainbow smelt, ruffe, white perch, gobies, zebra mussel, and exotic zooplankton.

3.3.1.5.2 Vertebrate Species of Greatest Conservation Need Associated with Lake Michigan

Eight vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with Lake Michigan (Table 3-57).

Table 3-53. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with Lake Michigan.

<i>Species Significantly Associated with Lake Michigan</i>	
Birds	
Horned Grebe	
Caspian Tern	
Common Tern	
Fish	
Lake Sturgeon	
Banded Killfish	
Herptiles	
Mudpuppy	
<i>Species Moderately Associated with Lake Michigan</i>	
Birds	
Bald Eagle	
Fish	
Greater Redhorse	

In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-57 were subject to further analysis. The additional analysis identified the best opportunities, by Ecological Landscape, for protection, restoration, and/or management of both Lake Michigan and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:

- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of Lake Michigan in each of the Ecological Landscapes (Tables 3-58 and 3-59).
- Using the analysis described above, a species was further selected if it had both a significant association with Lake Michigan and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of Lake Michigan. These species are shown in Figure 3-5.

Table 3-58. Vertebrate Species of Greatest Conservation Need that are (or historically were) significantly associated with Lake Michigan and their association with Ecological Landscapes that support Lake Michigan.

Lake Michigan						
Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type	Birds (3)*			Fish (2)		Herptiles (1)
	Horned Grebe	Caspian Tern	Common Tern	Lake Sturgeon	Banded Killifish	Mudpuppy
MAJOR						
Central Lake Michigan Coastal						
Northern Lake Michigan Coastal						
Southern Lake Michigan Coastal						

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Color Key

= HIGH probability the species occurs in this Ecological Landscape

= MODERATE probability the species occurs in this Ecological Landscape

= LOW or NO probability the species occurs in this Ecological Landscape

Table 3-59. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with Lake Michigan and their association with Ecological Landscapes that support Lake Michigan.

Lake Michigan Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type	Birds (1)*	Fish (1)
	Bald Eagle	Greater Redhorse
MAJOR		
Central Lake Michigan Coastal		
Northern Lake Michigan Coastal		
Southern Lake Michigan Coastal		

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Color Key



= HIGH probability the species occurs in this Ecological Landscape

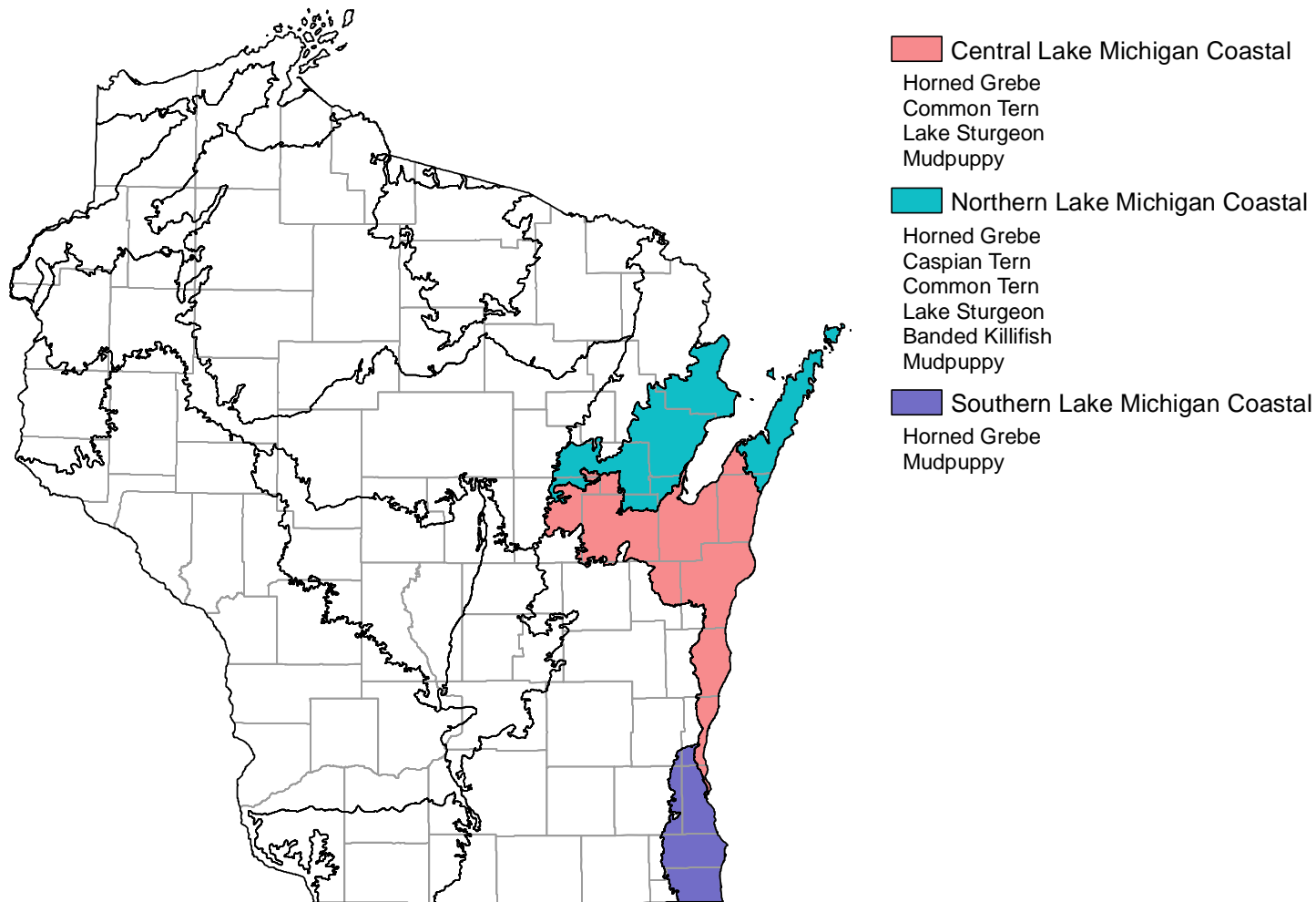


= MODERATE probability the species occurs in this Ecological Landscape



= LOW or NO probability the species occurs in this Ecological Landscape

Figure 3-5. Vertebrate Species of Greatest Conservation Need that have both a significant association with Lake Michigan and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of Lake Michigan.



3.3.1.5.3 Threats and Priority Conservation Actions for Lake Michigan

The following list of threats and priority conservation actions were identified for Lake Michigan. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Tables 3-58 and 3-59 unless otherwise indicated.

Threats and Issues

- Exotic aquatic species alter aquatic habitats, food webs and species interactions, and may have played and still be playing a role in the dramatic reductions seen in both yellow perch populations and in the lack of lake trout reproduction.
- Development and urbanization of harbors and river mouths is causing degradation and loss of wetland and aquatic habitats.
- Pollution from industrial micro-contaminants such as polychlorinated biphenyls (PCB's) is making fish unsafe to eat.
- Dams on tributaries block fish migrations.
- Poor watershed land-use practices are degrading nearshore and tributary habitat and water quality.
- Overfishing (now largely controlled and regulated) had historically depressed populations of lake trout and lake herring.

Priority Conservation Actions

- Various treaties, institutions, and citizen groups exist to help manage biodiversity in Lake Michigan, and these resources should be called upon to assist with management for Species of Greatest Conservation Need.
- Improve regulations and education to prevent the introduction of additional exotic species and slow the spread of existing aquatic invasive species.
- Protect and restore harbor and river mouth shoreline and wetland habitats, as is being done in the ongoing restoration of the Menominee River valley and estuary (Milwaukee County).
- Work to reduce or eliminate and remediate sources of micro-contaminants.
- Remove dams (as has been accomplished with the North Avenue Dam (Milwaukee County)) or install effective fish passage at dams.
- Improve watershed land-use practices to reduce non-point source pollution.
- Continue application of effective fisheries management, including ongoing efforts to restore the lake sturgeon population in the Milwaukee/Menominee rivers and estuary (Milwaukee County). The early 21st Century drop in alewife numbers may pose an opportunity to revitalize natural lake trout reproduction and to restore self-sustaining yellow perch and lake herring populations.